

### **Why is this project being proposed?**

Transportation Safety Advisory Committee (TSAC) was receiving multiple pedestrian safety concerns throughout this corridor. A citizens group known as the Safe Mass Ave Committee was formed to explore various pedestrian safety measures. In 2008 there was a pedestrian fatality. Additionally the accidents along this corridor exceed state averages and there are significant traffic backups on Pleasant Street, Maple Street, and Marrett Road every day. In 2008 the town commissioned a traffic safety study. As a result of that study town meeting approved design funding.

### **What is the State Involvement with this project?**

This project is a town project. It was initiated by citizen concerns and town meeting has consistently approved funding the study and design of this project. There have been several town run public meeting and workshops to get the design to where it is today. Based on the proposed design which has reduced pavement areas, improved pedestrian safety, bicycle accommodations, reduction of greenhouse gases, the state has agreed to pay for the construction. The state will be administering federal funding and the state will require compliance with commonly accepted design standards such as to Manual on Uniform Traffic Control Devices (MUTCD).

### **What is the Manual on Uniform Traffic Control Devices?**

The Manual on Uniform Traffic Control Devices (MUTCD) defines the standards used nationwide to install and maintain traffic control devices (pavement markings, signs, and traffic signals) on all public streets, highways, bikeways, and private roads open to public travel. The MUTCD is published by the Federal Highway Administration (FHWA) under 23 Code of Federal Regulations (CFR), Part 655, Subpart F and has been adopted by the Massachusetts Department of Transportation (MassDOT) as the State's standard. The MUTCD is updated periodically to accommodate the nation's changing transportation needs and address new safety technologies, traffic control tools and traffic management techniques. The latest edition was published in 2009.

### **What alternatives have been looked at for this corridor? And what are the current recommendations?**

The three primary intersections along this corridor have been analyzed for no-build, geometric improvements, signalization and roundabouts. The existing pedestrian signal at the east Lexington Library was evaluated for warrants and the existing emergency signal at the East Lexington Fire Station were evaluated for MUTCD compliance.

The current recommendations are to Signalize Pleasant Street and Maple Street and make geometric improvements at Marrett Road. The existing pedestrian signal at The East Lexington library is recommended to be removed and replaced with a pedestrian activated flashing beacon

that would go dark when not called reducing stop delays. The recommendation at the East Lexington fire station is to maintain the existing operation.

### **What is proposed at the East Lexington Fire Station /Locust Avenue?**

The proposal is to reinstall an upgraded Emergency pre-emption for the Emergency operations. Just like today, when there is an emergency call, Massachusetts Avenue and Locust Avenue will be stopped via a red light. When there is no emergency call, Locust will continue to operate as a “permissive move” (look both ways and go). The equipment will be ornamental, similar to the signal in the town center. The proposal does not fully signalize Locust Avenue.

### **Level of Service of these intersections are frequently referred to. What does this mean?**

Traffic operations are described by Level of Service (LOS), which is a qualitative measure that associates LOS with various Measures of Effectiveness (MOE). The MOE for roadway intersections is Average Vehicle Delay. The Average Vehicle Delay for an intersection is computed using national recognized analysis methodologies contained in the Highway Capacity Manual, published by the Transportation Research Board. LOS ranges from A to F, with F being failure. An LOS of A or B is not desirable, as it indicates that the road has excessive capacity for the volume of traffic that it serves. The relationship between LOS and Average Vehicle Delay is summarized in the table below. The LOS criteria for unsignalized intersections differ from signalized intersections because drivers expect different performance levels from each type of intersection.

Level of Service Criteria

Level Of Service	Unsignalized and Roundabout Intersection Criteria Average Vehicle Delay (Seconds per Vehicle)	Signalized Intersection Criteria Average Vehicle Delay (Seconds per Vehicle)
A	< 10.0	< 10.0
B	10.1 to 15.0	10.1 to 20.0
C	15.1 to 25.0	20.1 to 35.0
D	25.1 to 35.0	35.1 to 55.0
E	35.1 to 50.0	55.1 to 80.0
F	> 50.0	> 80.0

Source: Highway Capacity Manual, Transportation Research Board; Washington, DC; 2000

### **Meeting or not-meeting a ‘Warrant’ is frequently referred to. What does this mean?**

Justification for installation of a new traffic signal or continued use of an existing traffic signal requires an engineering analysis that includes an evaluation of the intersection operations and safety to determine if a traffic control signal is warranted at the location. After extensive study and analysis, the Federal Highway Administration (FHWA) developed nine traffic signal warrants which are contained in the Manual on Uniform Traffic Control Devices (MUTCD). These warrants, which consider vehicular and pedestrian volumes, delay, and crash history, are:

- Warrant #1 Eight Hour Vehicular Volume
- Warrant #2 Four Hour Vehicular Volume
- Warrant #3 Peak Hour Vehicular Volume
- Warrant #4 Pedestrian Volume
- Warrant #5 School Crossing
- Warrant #6 Coordinated Signal System
- Warrant #7 Crash Experience
- Warrant #8 Roadway Network
- Warrant #9 Intersection near a Railroad Grade Crossing

An intersection need only satisfy one of these warrants to justify installation or continued operation of a traffic signal. Satisfaction of one or more of these warrants in itself, however, does not require either the installation or continued operation of a traffic signal. Every situation is unique and warrant guidelines must be supplemented by the effects of specific site conditions and the application of good engineering judgment. Installation of a traffic signal should improve the overall safety and/or operation of an intersection and should be considered only when deemed necessary by careful traffic analysis.

### **Have a roundabouts been considered?**

Yes, both a single-lane and a multi-lane roundabouts have been evaluated, but neither option would be compatible with these locations. Due to the high traffic volumes at all three locations, the single-lane roundabouts would not provide sufficient vehicle capacity and would result in operations at Level of Service (LOS) F. The multi-lane roundabout would provide adequate capacity, with operations at LOS C or better; however, the impacts to right-of-way would be significant.

The following guides and methods were used in the analysis:

- National Cooperative Highway Research Program Report 672 - Roundabouts: An Informational Guide (Developed through the coordinated efforts of the American Association of State Highway and Transportation Officials (AASHTO), Federal Highway Administration (FHWA), U.S. Department of Transportation (USDOT)),
- Analysis Methodologies contained in the Highway Capacity Manual (HCM) published by the Transportation Research Board,
- SIDRA Intersection - Intersection analysis software which implements the analysis methodologies contained in the HCM,

### **How does the traffic flow today?**

Under existing conditions, the Marrett Road eastbound approach operates at LOS F during both the weekday morning and afternoon peak hours. The Mass Ave northbound left-turn movement operates at LOS D during the weekday morning peak hour and LOS B during the weekday afternoon peak hour. The Maple Street westbound left-turn movement operates at LOS F during both peak hours, while the Maple Street westbound right-turn movement operates at LOS F and E during the weekday morning and afternoon peak hours, respectively. During both peak hours, the Pleasant Street east bound left-turn operates at LOS F and the Pleasant Street eastbound right-turn operates at LOS C.

### **What if we do nothing?**

Under the future (2023) No Build condition, the Marrett Road eastbound approach operates at LOS F during both the weekday morning and afternoon peak hours. The Mass Ave northbound left-turn movement operates at LOS D during the weekday morning peak hour and LOS B during the weekday afternoon peak hour. The Maple Street westbound left- and right-turn movements operate at LOS F during both peak hours. During both peak hours, the Pleasant Street eastbound left-turn operates at LOS F and the Pleasant Street eastbound right-turn operates at LOS C. The Follen Road approach operates at LOS D during the weekday morning peak hour and at LOS C during the weekday afternoon peak hour.

### **How will the traffic flow under signalization?**

At Maple Street, The overall intersection is expected to operate at LOS C and D during the weekday morning and afternoon peak hours, respectively, under this alternative, the Maple Street eastbound Left-turn lane will operate at LOS D during the weekday morning peak hour and LOS E during the weekday afternoon peak hour.

At Pleasant Street the overall intersection will operate at LOS C and D during the weekday morning and afternoon peak hours, respectively, with the Pleasant Street eastbound left-turn lane operating at LOS B and C during the weekday morning and afternoon peak hours, respectively.

### **Will these signals be coordinated?**

Maybe, the two locations are approximately 3000 feet apart. Further analysis concerning the distance between signals and other critical variables is currently being evaluated.

### **How will the town mitigate the neighborhood cut through traffic created by signalization?**

One of the goals of this project from its inception is to provide relief to the existing cut through traffic. We believe this project will reduce the existing backups on Maple Street, Pleasant Street and Marrett Road. These existing backups currently result in cut through traffic particularly along Peacock Farm Road and Follen Road. The town has collected speed and volumes along

the corridor and along neighborhood streets surrounding this project. Traffic calming evaluations are currently under way and the town will continue to work with the neighborhoods.

The town has contracted with VHB to look at existing conditions and potential impacts with the proposed design to cut through traffic. As this project moves forward a follow-up traffic monitoring program will be in place to evaluate the potential impacts to any of the concerned neighborhoods including Peacock Farm, and Follen Road neighborhoods. If needed, traffic calming measures will be implemented for the impacted neighborhood.